

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## A2 CC1 Forms of a Line

Linear functions come in a variety of forms. The two shown below have been introduced in Common Core Algebra I and Common Core Geometry.

**TWO COMMON FORMS OF A LINE****Slope-Intercept:**  $y = mx + b$ **Point-Slope:**  $y - y_1 = m(x - x_1)$ 

where  $m$  is the slope (or average rate of change) of the line and  $(x_1, y_1)$  represents one point on the line.

**Exercise #1:** Consider the linear function  $f(x) = 3x + 5$ .

(a) Determine the  $y$ -intercept of this function by evaluating  $f(0)$ .

(b) Find its average rate of change over the interval  $-2 \leq x \leq 3$ .

**Exercise #2:** Consider a line whose slope is 5 and which passes through the point  $(-2, 8)$ .

(a) Write the equation of this line in point-slope form,  $y - y_1 = m(x - x_1)$ .

(b) Write the equation of this line in slope-intercept form,  $y = mx + b$ .

**Exercise #3:** Which of the following represents an equation for the line that is parallel to  $y = \frac{3}{2}x - 7$  and which passes through the point  $(6, -8)$ ?

(1)  $y - 8 = -\frac{2}{3}(x + 6)$       (3)  $y + 8 = \frac{3}{2}(x - 6)$

(2)  $y - 8 = \frac{3}{2}(x + 6)$       (4)  $y + 8 = -\frac{2}{3}(x - 6)$

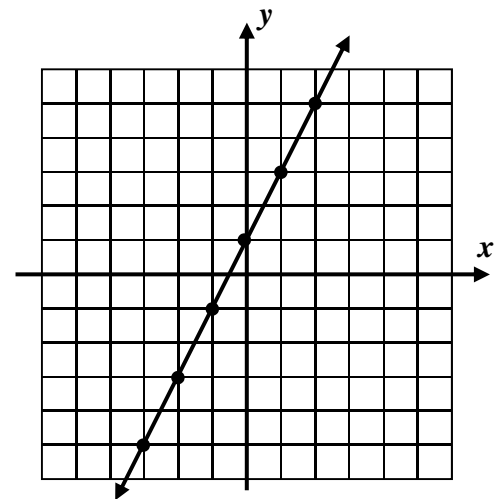
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**Exercise #4:** A line passes through the points  $(5, -2)$  and  $(20, 4)$ .

- (a) Determine the slope of this line in simplest rational form.
- (b) Write an equation of this line in point-slope form.
- (c) Write an equation for this line in slope-intercept form.
- (d) For what  $x$ -value will this line pass through a  $y$ -value of 12?

**Exercise #5:** The graph of a linear function is shown below.

- (a) Write the equation of this line in  $y = mx + b$  form.
- (b) What must be the slope of a line perpendicular to the one shown?
- (c) Draw a line perpendicular to the one shown that passes through the point  $(1, 3)$ .
- (d) Write the equation of the line you just drew in point-slope form.
- (e) Does the line that you drew contain the point  $(30, -15)$ ? Justify.



## FORMS OF A LINE

### HOMEWORK

#### FLUENCY

1. Which of the following lines is *perpendicular* to  $y = \frac{5}{3}x - 7$  and has a y-intercept of 4?

(1)  $y = \frac{5}{3}x + 4$

(3)  $y = 4x - \frac{3}{5}$

(2)  $y = -\frac{3}{5}x + 4$

(4)  $y = \frac{3}{5}x + 4$

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2. Which of the following lines passes through the point  $(-4, -8)$ ?

(1)  $y + 8 = 3(x + 4)$

(3)  $y + 8 = 3(x - 4)$

(2)  $y - 8 = 3(x - 4)$

(4)  $y - 8 = 3(x + 4)$

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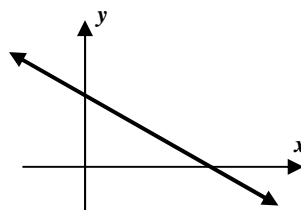
3. Which of the following equations could describe the graph of the linear function shown below?

(1)  $y = \frac{2}{3}x - 4$

(3)  $y = -\frac{2}{3}x - 4$

(2)  $y = \frac{2}{3}x + 4$

(4)  $y = -\frac{2}{3}x + 4$



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4. For a line whose slope is  $-3$  and which passes through the point  $(5, -2)$ :

(a) Write the equation of this line in point-slope form,  $y - y_1 = m(x - x_1)$ .

(b) Write the equation of this line in slope-intercept form,  $y = mx + b$ .

5. For a line whose slope is  $0.8$  and which passes through the point  $(-3, 1)$ :

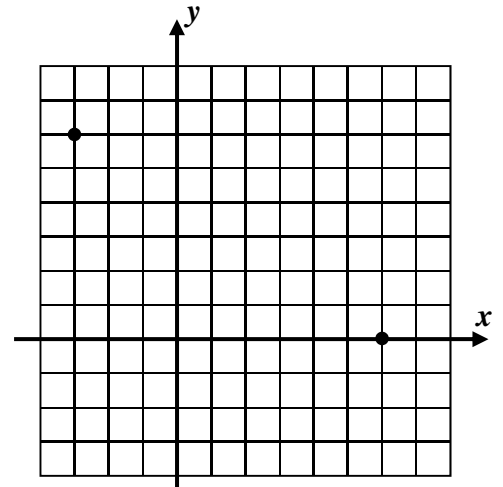
(a) Write the equation of this line in point-slope form,  $y - y_1 = m(x - x_1)$ .

(b) Write the equation of this line in slope-intercept form,  $y = mx + b$ .

## REASONING

6. The two points  $(-3, 6)$  and  $(6, 0)$  are plotted on the grid below.

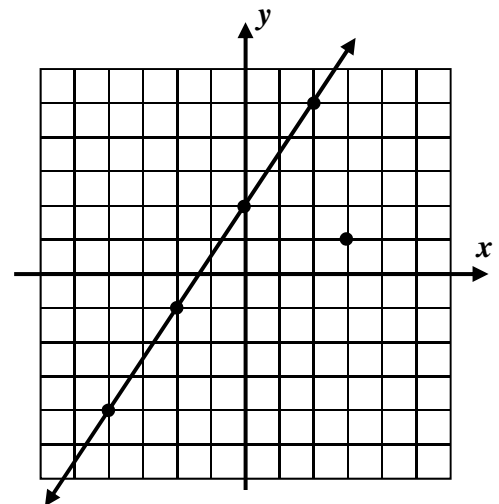
- (a) Find an equation, in  $y = mx + b$  form, for the line passing through these two points. Use of the grid is optional.



- (b) Does the point  $(30, -16)$  lie on this line? Justify.

7. A linear function is graphed below along with the point  $(3, 1)$ .

- (a) Draw a line parallel to the one shown that passes through the point  $(3, 1)$ .
- (b) Write an equation for the line you just drew in point-slope form.



- (c) Between what two consecutive integers does the y-intercept of the line you drew fall?

- (d) Determine the *exact* value of the y-intercept of the line you drew.